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refer especially to the expeditions sent out for collecting and study; a two-months' trip from a Massachusetts college to Cuba to make a geological collection, or from an Ohio college to the Maine coast for an anthropological collection, offers two or three of the best men an opportunity for broadening experience and further first-hand study; which is a fit reward for excellency in geology or archeology; and the men respond to it.

Of necessity the plans of such an expedition, when they are to serve as a stimulus to scholarship, must be carefully thought through. The membership must be limited to men who have earned the right. The field should be distant enough to be a new experience. The objects of the expedition must be broad enough to interest not only those who go, but their fellow students. The manner of life should be as untrammelled as practicable, camping if possible. In general, research work would be too technical for the main object of such an expedition; but it is rare indeed that two months of active work by a party of three or four fails to bring to light some new form, or make some concrete contribution to knowledge. And it is this possibility, like the vein of gold to the prospector, which urges the men ever on; and upon their return, it is the account of this success which brings the cheers of their fellows. This last is a very important part of an expedition, being the dramatic moment which completes the trip.

While such natural sciences as anthropology, biology, botany, geology and zoology most easily lend themselves to expeditions, other departments like economics, physics, chemistry, etc., can use them for study and accumulation of data if not for collecting. Languages and mathematics will find methods along different lines. But I believe that in all cases the prize which will stimulate the best scholastic work is to offer the successful competitors a broader opportunity, and an experience which will probably not come to him again in later life. It is a taste of the fruit which mature work in his field offers.

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HISTORICAL GRAPHICS

TO THE EDITOR OF SCIENCE: The two recent letters in SCIENCE with the above title suggest the hope that many other teachers are presenting the personal and historical sides of their subjects along with the scientific and formal parts, and are using charts like those described. It would be well worth the time needed, to require students to make such charts for different subjects, suitable brief lists of names with dates being furnished them and proper scales being suggested. It is obvious that where it is important to note contemporary lives—as in studying Italian art, or the wars between England and France, or between the kings of Judah and Israel—such charts are practically indispensable. If it is desired to unite in one chart both duration, as of lives, and dates of events, it is sometimes better to put the time in a vertical column.

But do not let it be overlooked that we owe this ingenious device to the famous Dr. Joseph Priestley, F.R.S., the chemist, historian, political writer and theologian. In 1765 he published "A Chart of Biography" which ran through many editions, including one at Philadelphia in 1803. A similar idea was utilized in "A New Chart of History" in 1770, of which a fifteenth edition appeared in 1816. His "Lectures on History," 1788, and several times reprinted, are accompanied by a small specimen of each chart. In one place he says:

The state of the world with respect to persons . . . may be exhibited with ease and advantage by means of *lines* and *spaces*. . . . Our idea of *time* is always that of a *line*.

The advantages are set forth at length. His original chart covered the period 1200 B.C. to about 1750 A.D. and had 2,000 names divided into classes, with dates and areas; durations that were certain were represented by full lines; uncertain periods by dotted lines. These principles were clearly applied in the "Biographical Chart" with fifty names prefixed to his voluminous "History and Present State of Vision, Light and Colors," 1772.

As Americans we have a special interest in the man, because of his association with Ben-

jamin Franklin, who suggested that he write a history of electricity and to whom he dedicated his "Description of a Chart of History," and because the later years of his life were spent in Pennsylvania.

CHARLES K. WEAD

THE ZIA MESA AND RUINS

IN Mr. Edgar L. Hewett's "Antiquities of the Jemez Plateau, New Mexico," page 45, the description of village No. 41 reads:

On a partially isolated bit of mesa about three miles west of Jemez is a considerable ruin, which does not bear evidence, however, of long occupancy. The summit of the mesa is without trees and almost without soil, and water must have been obtained from below. The walls of the ruin are well defined, and stand in place five or six feet in height; but they are formed of rough, loosely laid stones, and are extremely thin and unstable. They could not have been high at any time, as there is a marked absence of débris, and the dearth of pottery and kitchen refuse would seem to stamp the place as a temporary or emergency abode. The site is favorable for defense, and there are traces of defensive walls along the margin and the summit. The buildings are irregular in plan and comprise three groups, the full length of the groups being about 450 feet and width 350. . . . There appears to be no definite historic reference to this site.¹

I wish to call attention to the last sentence quoted:

The archives at Santa Fé state that when Diego de Vargas Zapata Lujan Ponce de Leon, governor of El Paso and the Northern Province, made his first entrada northward in 1692 he found that the Zias and Santa Annas together had built a new village on Mesa Colorado (Red Mesa) and the Jemez, Santo Domingo and a few Apaches were fortified on the other mesa at the forks of the river. The Zias readily submitted but the Jemez were hostile. Their place submitted finally, October 26, 1692.²

Also when bringing the hostile pueblos under

¹ Smithsonian Institution, Bureau of American Ethnology, Bulletin 32, pp. 45-6. Also see "Notes on the Jemez Valley, New Mexico," by W. H. Holmes, *American Anthropologist*, Vol. I., No. 2, April-June, 1905.

² Also see Bancroft's "History," the volume on New Mexico and Arizona.

subjugation, Governor Vargas with 120 men joined the Queres under Chief Ojeda in an attack on the Jemez on July 21, 1694. While en route the Zia Mesa (Mesa Colorado) was captured, five men being killed. Then on July 24 they took the Jemez mesa-pueblo, called Mesa Don Diego. The fight here was one of the fiercest fought, the Queres did much in securing the place. Here Don Eusebio de Vargas, brother of the governor, distinguished himself. The Jemez lost 81 killed, 371 prisoners, the village was sacked and burned, 300 *fanegas* of corn were captured. The Jemez governor, Chief Diego, was surrendered, first condemned to be shot, but finally sent as a slave to the mines of Nueva Vizcaya; the Indians surrendered him, it is stated, saying that he had been the cause of the trouble. The prisoners, in part, were allowed to go back to Jemez and build on the old site in the valley, if they would promise to aid in the wars when needed. Their wives and children were kept as hostages till after the capture of San Ildefonso, which was then still holding out against the Spanish authority.³

The village on Mesa Colorado referred to in the archives is undoubtedly the ruin No. 41, mentioned by Mr. Hewett and also by Mr. Holmes. The writer has often visited the mesa and village in question. The rocks of the mesa are almost blood red in color, so red that even the walls of the writer's office in the Jemez village three miles distant were caused to have a reddish glow from the reflected sunlight in the early morning hours. There is no other mesa in the vicinity on which a village-ruin is situated, except the one at the forks of the river on which the old Jemez village was located. Furthermore, the Jemez people call the Red Mesa the Zia Mesa to-day; and the Zias themselves say that their people once lived on it. The ruin on it, I reassert, is undoubtedly the Zia pueblo on Mesa Colorado mentioned in the Spanish records.

Note.—In all the archeological notes on the Jemez region there seems to be no mention of the remains of an ancient reservoir back of the white buttes at the mouth of a canyada that comes down from the foothills and enters the valley-flat adjacent to the Zia Mesa. This reservoir doubtless supplied the village with water for drinking purposes at times.

³ "Archives, New Mexico," 158-162.